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13. ABSTRACT *(Maximum 200 words)*

The goal of this project is to (1) assess the validity of medical claims information for tracking breast cancer diagnoses, treatments, and outcomes; (2) use Medicare data, linked SEER cancer registry data, and claims data from large firms to analyze trends in diagnosis rates and staging, treatment, expenditures, and outcomes for Americans with breast cancer; and (3) analyze the cost effectiveness of alternative patterns of breast cancer diagnosis and treatment. A principal cause of the limited evidence on trends and cost-effectiveness of cancer care for the elderly is the absence of precise information on the utility of medical claims databases for understanding cancer epidemiology, treatments, costs, and outcomes in large, representative population groups. To date, the project has made substantial progress in (1) constructing a set of rules for identifying cancer cases in administrative data with much higher sensitivity and specificity estimates and more accurate time of diagnosis estimates than previously reported; and (2) demonstrating the feasibility on breast cancer of an important methodological step (instrumental variables) necessary for attributing differences in outcomes to treatment differences.

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FOREWORD

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Mark McMillan 6-29-1998

PI Signature Date

Table of Contents

a. **Introduction**

The goal of this project is to (1) assess the validity of medical claims information for tracking breast cancer diagnoses, treatments, and outcomes; (2) use Medicare data, linked SEER cancer registry data, and claims data from large firms to analyze trends in diagnosis rates and staging, treatment, expenditures, and outcomes for Americans with breast cancer; and (3) analyze the cost effectiveness of alternative patterns of breast cancer diagnosis and treatment.

b. **Body**

Much of our initial work has involved cleaning and processing the claims data and linked SEER-Medicare data that are intended to be the core of our research program. While the data checking and revision (working collaboratively with NCI and IMS) has been time-consuming and has not led to any publications, it has led to some important improvements in the quality of the linked data, and may have an important impact on future linkages. For example, we were able to identify incomplete reporting of some claims files for some registry patients in certain registries and years, and we identified a general problem with identifiers for outpatient hospitals. We have developed methods for conducting our analyses of outpatient providers using unlinked claim files that overcome this limitation, and we have described how to avoid the problem in future SEER-MEdicare linkages. As a result, all of the research groups using the SEER-Medicare data will benefit from our data work. In addition, we have also developed complete claims files for the entire Medicare population for patients ever treated on an inpatient or outpatient basis in association with a diagnosis of breast cancer. These very large files required considerable effort for data management and cleaning as well.

Figure 1: Breast Cancer Cumulative Sensitivity vs. 1-TICP

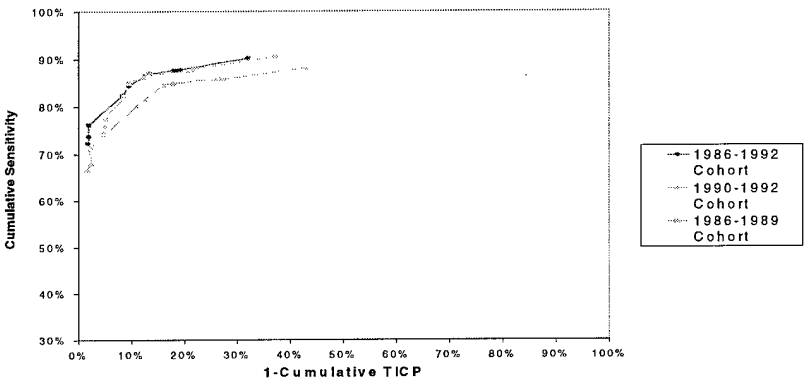


Figure 2: Timing Differences Between SEER and Medicare Claims
SEER Incident Breast Cancer Cases Matching in Categories 1-7

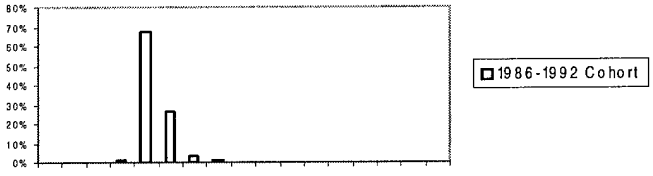
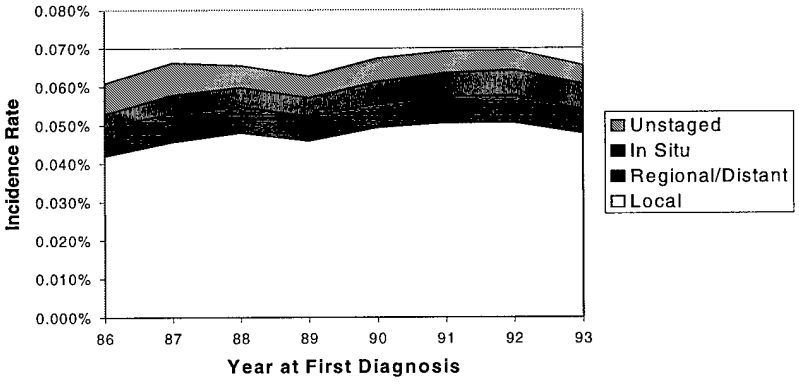


Figure 3: Breast Cancer Incidence Rates
Elderly Females by Stage



Despite the time required to develop reliable, complete analytic claims files from the SEER-Medicare data and our complete cancer claims data, we have already completed substantial work toward our specific aims. During the last year of work, we have completed much of the work of Aim 1 of our proposal: evaluating the validity of Medicare claims data for identifying cancer patients and studying cancer trends. We have completed a manuscript that develops a comprehensive sensitivity-specificity (ROC) framework for evaluating different rules for identifying cancer cases from claims, and that also

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evaluates many other claims-data issues such as the value of prior-years' data to exclude prevalent cases and the value of complete physician records (often unavailable in managed-care plans) to find cases. The manuscript summarizes our work on applying these methods to breast cancer. Figure 1, taken from the manuscript, illustrates the sensitivity and specificity of a range of sequential rules for identifying incident breast cancer cases from claims data. Our main conclusion, consistent with prior studies, is that claims data have important limitations in case-finding. On the other hand, our methods result in much higher sensitivity and specificity estimates than have been reported previously. Our "preferred" rules for identifying cancer cases yield sensitivity and predictive-value positive estimates in the range of 75 to 80 percent or higher. Moreover, for true incident cases, claims data are surprisingly accurate in capturing the precise time of diagnosis (figure 2). In our current work, we are evaluating the quantitative differences between analyses of cancer trends and/or the effects of alternative cancer practices based on claims data, versus analyses based on administrative data linked to registry records.

We have also begun work on Aims 2 and 3: studies of trends in breast cancer care, and instrumental-variables estimates of the effects of alternative cancer practices. We have replicated previous studies of trends in cancer incidence, treatment, and outcomes for breast cancer (Figure 3). We are also describing trends in expenditures and utilization for all of this cancer,

TABLE 1: DESCRIPTIVE STATISTICS BY DIFFERENTIAL DISTANCE TO ONCOLOGY HOSPITAL
1986 -1993 STAGE 1,2 ELDERLY BREAST CANCER PATIENTS, SEER-LINKED MEDICARE CLAIMS DATA

		DIF DIST<=, > 8 MILES		INITIAL TREATMENT	
	Full Cohort (N=34,921)	NEAR (N=23,809)	FAR (N=11,112)	ONCOLOGY (N=16,828)	NON- ONCOLOGY (N=16,902)
DEMOGRAPHIC VARIABLES			Means and Rates		
Age	74.0	73.9	74.2	73.8	74.3
(SD)	(6.9)	(7.0)	(6.9)	(7.0)	(6.8)
Black	3.4	4.7	0.5	4.5	2.4
INITIAL TREATMENT AT ONCOLOGY H.	49.9	65.0	17.9	100.0	0.0
STAGE			Rates		
Stage 1, modified AJC	53.3	53.4	53.0	53.8	52.5
Stage 2, modified AJC	46.7	46.6	47.0	46.2	47.5
Local, historic	73.2	73.3	73.0	73.3	72.6
Regional-Distant, historic	26.8	26.7	27.0	26.7	27.4
TREATMENTS (5% sample)			5 Year Rates		
Mastectomy	77.4	75.2	81.9	74.9	81.1
Lumpectomy	64.5	66.7	60.2	67.0	63.1
Lumpectomry, no Mastectomy	19.6	21.8	15.4	22.0	16.8
Neither Lumpectomy or Mastectomry	3.0	3.1	2.8	3.1	2.1
Chemotherapy	10.6	10.6	10.7	11.2	10.3
Radiation	25.0	26.9	21.4	27.0	23.0
OUTCOMES			5 Year Rates		
Mortality	27.8	27.9	27.7	26.5	28.9
UTILIZATION			5 Year Days		
Acute hospital	19.2	19.7	18.2	19.6	19.3
	(26.5)	(24.6)	(27.4)	(26.5)	(26.7)
Nonacute hospital	6.4	6.9	5.2	6.3	6.5
	(28.8)	(27.2)	(29.5)	(28.7)	(29.1)
EXPENDITURES (1993 Dollars)			5 Year Expenditures		
Inpatient	14,712	15,554	12,970	15,132	14,566
	(18,684)	(16,149)	(19,738)	(18,874)	(18,556)
Outpatient	3,763	4,043	3,184	4,081	3,530
	(5,089)	(4,223)	(5,436)	(4,653)	(5,509)
Physician	11,569	12,490	9,877	12,404	10,912
	(8,247)	(6,982)	(8,729)	(7,977)	(8,502)
Hospice	136	149	108	155	121
	(1,395)	(1,314)	(1,432)	(1,315)	(1,494)
Home Health Agency	969	1,065	772	1,014	933
	(3,866)	(3,068)	(4,194)	(4,064)	(3,636)

with some notable preliminary findings. In contrast to the costs of care for many other serious chronic illnesses, expenditures per patient with localized (stage I or II) cancers have not increased noticeably for breast cancer patients. The flat expenditure trends in turn reflect two countervailing trends in utilization: declining rates of inpatient hospital care, offset by increasing intensity of treatment and expenditures in the outpatient setting. For patients with metastatic cancers, our preliminary results suggest that inpatient intensity of care and total expenditures are increasing steadily.

We have begun to develop our instrumental-variables methods on breast cancer. We have found that differential distance to alternative types of cancer providers -- specifically, highly-specialized cancer treatment facilities and radiation treatment facilities -- is a strong predictor of initial as well as subsequent treatment by such providers, and (in race-specific analyses) is not associated with any significant differences in the characteristics or severity of disease of breast cancer patients. In turn, differential distance is also a strong predictor of less surgically-intensive management of breast cancer, particularly since 1989 (Table 1). In contast to the characteristics of patients actually treated by specialized centers, the similarity of characteristics across these differential-distance groups suggest that we can attribute differences in outcomes across the instrumental-variables groups to the treatment differences. Our preliminary analyses suggest that the alternative treatment methods do not lead to substantial differences in mortality (though our followup will be relatively limited until the next SEER-Medicare update next year); however, less aggressive surgery leads to significantly higher medical expenditures. In part this is the result of expenditures for radiation therapy, but it also appears to reflect more aggressive long-term followup as well. An important issue in these applications is the correlation between cancer diagnostic practices and cancer therapeutic practices. For example, Medicare beneficiaries living near cancer centers are somewhat more likely to undergo regular breast screening examinations, especially at advanced ages, and this results in a gradient of cancer incidence that declines with differential distance from a specialized cancer center. We are currently exploring whether this correlation requires any substantial modification of our instrumental-variables methods.

c. Conclusions

A principal cause of the limited evidence on trends and cost-effectiveness of cancer care for the elderly is the absence of precise information on the utility of medical claims databases for understanding cancer epidemiology, treatments, cost, and outcomes. The uncertainty about the cost-effectiveness of alternative cancer screening and treatment practices in elderly populations underscores a critical need for more research on treatments, costs, and outcomes based on large, representative population groups. To date, the project has made substantial progress in (1) constructing a set of rules for identifying cancer cases in administrative data with much higher sensitivity and specificity estimates and more accurate time of diagnosis estimates than previous reported; and (2) demonstrating the feasibility on breast cancer of an important methodological step (instrumental variables) necessary for attributed differences in outcomes to treatment differences.

The next year will see additional work on the application of instrumental-variable methods for evidence on the cost-effectiveness of alternative approaches to cancer management for breast cancer. Also, the completion of a manuscript on the trends in breast cancer incidence, treatment, outcomes, expenditures, and utilization.

d. References

"Understanding Medicare Expenditure Growth: The role of Changes in Diseases, Technologies, and Prices," Stanford University Working Paper, submitted for publication, 1997.

"The Use of Medical Encounter Data for Cancer Epidemiology: Sensitivity, Specificity, and Trend Analysis," with Sarah Lee and Hugh Roghmann, Stanford University working paper, 1997.